Spatial assignment of test sample

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Input

Website Identifier: 294

Isotope values of test sample

Table 1: Isotope values of test sample

<table>
<thead>
<tr>
<th>13C/12C</th>
<th>15N/14N</th>
<th>18O/16O</th>
<th>2H/1H</th>
<th>34S/32S</th>
</tr>
</thead>
<tbody>
<tr>
<td>-21</td>
<td>10.9</td>
<td>17.6</td>
<td>-34.4</td>
<td>13.6</td>
</tr>
</tbody>
</table>

Output

Model

```
# Call:
train.kknn(formula = fmla, data = ivory.train, kmax = 15, distance = 2, kernel = knl)
```

# Type of response variable: nominal
# Minimal misclassification: 0.3765867
# Best kernel: triangular
# Best k: 15

Classifier: country_code
Best fitted reference sample:

- Site: Botswana, Ghanzi area
- Country: BW
- Region: Southern Africa
- CITES: Appendix II
- Lat: -21.72
- Lon: 21.93
Assignment of test sample to nearest neighbours

Best fitted reference entries

Table 2: Details of best fitted reference entry (row 1) and other fitted entries within best classifier

<table>
<thead>
<tr>
<th>lon</th>
<th>lat</th>
<th>location</th>
<th>13C/12C</th>
<th>15N/14N</th>
<th>18O/16O</th>
<th>2H/1H</th>
<th>34S/32S</th>
</tr>
</thead>
<tbody>
<tr>
<td>21.93</td>
<td>-21.72</td>
<td>Botswana, Ghanzi area</td>
<td>-20.9</td>
<td>10.0</td>
<td>17.9</td>
<td>-35.0</td>
<td>13.9</td>
</tr>
<tr>
<td>23.34</td>
<td>-19.80</td>
<td>Botswana, Maun area</td>
<td>-20.3</td>
<td>10.9</td>
<td>17.9</td>
<td>-37.0</td>
<td>12.5</td>
</tr>
<tr>
<td>23.34</td>
<td>-19.80</td>
<td>Botswana, Maun area</td>
<td>-20.3</td>
<td>11.1</td>
<td>17.7</td>
<td>-37.2</td>
<td>14.9</td>
</tr>
<tr>
<td>28.91</td>
<td>-22.20</td>
<td>Botswana, Mathathane area</td>
<td>-19.9</td>
<td>10.9</td>
<td>17.5</td>
<td>-29.9</td>
<td>12.4</td>
</tr>
<tr>
<td>23.34</td>
<td>-19.80</td>
<td>Botswana, Maun area</td>
<td>-21.8</td>
<td>11.1</td>
<td>18.6</td>
<td>-37.0</td>
<td>14.9</td>
</tr>
<tr>
<td>27.73</td>
<td>-21.89</td>
<td>Botswana, Mmadinare area</td>
<td>-21.1</td>
<td>10.3</td>
<td>17.1</td>
<td>-27.2</td>
<td>12.8</td>
</tr>
<tr>
<td>25.13</td>
<td>-17.84</td>
<td>Botswana, Kasane / Chobe area</td>
<td>-21.0</td>
<td>10.1</td>
<td>16.7</td>
<td>-40.1</td>
<td>12.5</td>
</tr>
<tr>
<td>21.92</td>
<td>-21.72</td>
<td>Botswana, Ghanzi area</td>
<td>-20.5</td>
<td>11.1</td>
<td>17.8</td>
<td>-42.9</td>
<td>12.8</td>
</tr>
<tr>
<td>28.42</td>
<td>-22.00</td>
<td>Botswana, Bobonong area</td>
<td>-22.0</td>
<td>9.6</td>
<td>17.2</td>
<td>-34.2</td>
<td>12.9</td>
</tr>
</tbody>
</table>

Country of prediction: BW

Testing robustness of assignment: Wilcoxon signed rank test

If p-value > 0.05, the test concludes that the isotope signature of the test sample is similar to the respective nearest neighbour reference sample.

P-values for the k nearest neighbours in Wilcoxon Test

“0.53255, 0.40049, 0.14562, 0.13370, 0.11207, 0.09322, 0.00790, 0.00160, 0.00052”
Goodness of fit of test sample:

- good fit: if $p > 0.05$ for at least two tested nearest neighbour reference samples;
- moderate fit: if $p > 0.05$ for at least one tested nearest neighbour reference samples;
- uncertain: if $p > 0.05$ for none of the tested nearest neighbour reference samples.

Assumption: At least two nearest reference samples are available.

Overall goodness of fit of test sample: “good fit”